Thursday, August 26, 2021
9:02 AM

Conditional statement $p \to q$ false if 'p' is True & 'q' is false otherwise is True.

p	q	$p \to q$
T	T	T
T	F	F
F	T	T
F	F	T

If 'p', then 'q'

If $2^n \geq 100$ then $2+3=5$

p: $2^n \geq 100$, q: $2+3=5$

$2^n \geq 100 \Rightarrow 2+3=5$

If $2+3=6$ then $2^n \geq 100$

$2+3=6 \to 2^n \geq 100$

p	q	$p \to q$
T	T	T
T	F	F
F	T	T
F	F	T

$p \to q$ promise / obligation / contract

If Rohan gets 95% in ETE, he will get 'O' Grade.

p: Rohan gets 95% in ETE

q: Rohan gets 'O' Grade.

kept

and but

A true Prop. can imply a True prop. only

" can't " " False.

The statement $p \to q$ is called a conditional statement because $p \to q$ asserts that q is true on the condition that p holds. A conditional statement is also called an **implication**.

The truth table for the conditional statement $p \to q$ is shown in Table 5. Note that the statement $p \to q$ is true when both p and q are true and when p is false (no matter what truth value q has).

Because conditional statements play such an essential role in mathematical reasoning, a variety of terminology is used to express $p \to q$. You will encounter most if not all of the following ways to express this conditional statement:

"if p, then q" "p implies q"

p: f(x) is diff'ble

q: f(x) is cont.

$p \to q$

$q \to p$

$f(x) = |x|$ at $x = 0$

following ways to express this conditional statement:

$p \to q$

$f(x) = |x|$ at $x = 0$

"if p, then q"
"if p, q"
"p is sufficient for q"
"q if p"
"q when p"
"a necessary condition for p is q"
"q unless $\neg p$"
"p implies q"
"p only if q"
"a sufficient condition for q is p"
"q whenever p"
"q is necessary for p"
"q follows from p"

q only if p

(1) f(x) is cont. only if f(x) is diff.able

(2) " " diff.able " " " cont. p only if q

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"a necessary condition for p is q"
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"p implies q"
"p only if q"
"~~a sufficient condition for q is p~~"
"q whenever p"
"q is necessary for p"
"q follows from p"

cont.

f(x) is diff.able when/whenever

f(x) is cont. diff.able.

(1) Diff.ability is Necessary for continuity

(2) Continuity is " for diff.ability

p: f(x) is diff.able.

q: " " cont.